WHAT IS CLAIMED IS

1. A method for reducing the interfering effect of a radar transmitter occupying a nominal frequency bandwidth into an other operating band, where said other operating band is spaced from said nominal frequency bandwidth by a third frequency band, said method comprising the steps of:

generating at said radar transmitter a constant-amplitude pulse centered at a frequency within said nominal frequency bandwidth of said radar and having a nominal bandwidth which lies within said nominal frequency bandwidth, and which also has an actual bandwidth which extends into said other operating band;

applying phase perturbations to said constant-amplitude pulse so as to produce a phase-perturbed constant-amplitude pulse centered at said frequency within said nominal frequency bandwidth of said radar with reduced amplitude of that portion of said actual bandwidth of said constant-amplitude pulse which lies within said other operating band; and

transmitting said phase-perturbed constant-amplitude pulse toward a radar target.

2. A method for reducing interference between constant-amplitude long-range and short-range radar subpulses, where said long-range radar subpulses are centered at a first frequency and have a first nominal passband and said short-range pulses are centered at a second frequency, different from said first frequency and having a second nominal passband, the passband of at least one of said long-range and short-range

radar subpulses extending at least partially into said nominal passband of the other of said long-range and short-range radar subpulses, said method comprising the steps of:

selectively applying phase perturbations to said one of said long-range and short-range radar subpulses to tend to null that portion of said passband of said one of said long-range and short-range radar subpulses which extends into said nominal passband of said other one of said long-range and short-range radar subpulses.

3. A method according to claim 2, wherein said step of selectively applying phase perturbations includes the steps of:

(a) Compute s_k, the nominal pulse's k^{th} digital sample as:

$$s_k = \cos\left(2\pi\left(\frac{f_0}{f_s}\right)k + \theta_k\right)$$

where:

k is a sample index ranging between 1 and N, the total number of samples in the net pulse;

f_0 is the pulse's center frequency at the input to the digital-to-analog (D/A) converter;

f_s is the sample rate at which the signal samples are to be read out of a digital memory (and the same rate at which the D/A converter operates); and

θ_k is the pulse's nominal phase modulation function;

(b) compute the phase perturbation as:

$$\phi = \lambda\left[\lambda\mathbf{DRD}+\mathbf{I}\right]^{-1}\mathbf{DR}\mathrm{s}$$

where:

ϕ is an N x 1 column vector of phase perturbation samples with k^{th} element equal to ϕ_k;

λ is a positive scalar, greater than unity, whose value determines null depth;

D is an N x N diagonal matrix (all off-diagonal elements are zero) whose k^{th} diagonal element is similar to s_k with the cosine function replaced by the sine;

R is an N x N matrix that determines null center frequency, width, and shape;

I is an N x N identity matrix; and

s is an N x 1 vector whose k^{th} element is equal to s_k , to thereby define a k^{th} signal sample as

$$\tilde{s}_k = \cos\left(2\pi\left(\frac{f_0}{f_s}\right)k + \theta_k + \phi_k\right)$$

where the tilde indicates a sample of the phase-perturbed pulse and ϕ_k is the k^{th} sample of the phase perturbation that creates the desired spectral null.